9. The Resellers claim that the cellular market is not "fully competitive". However, perfect competition is the incorrect standard and cannot occur in cellular service markets because of limited spectrum. It is important, however, to establish the operative question in discussing regulatory goals. While the presence of a duopoly situation for wholesale service, as established by the FCC, and cellular technology, rules out the market structure of many small, individually insignificant, competitors (i.e. perfect competition), the FCC should decide whether regulation is likely to achieve a better economic outcome than the market outcome which would occur under forbearance from rate regulation.

10. My econometric analysis and experience from North Carolina demonstrates that forbearance from regulation leads to a better outcome than regulation of cellular service. There will never be perfect competition among mobile radio firms because of limited spectrum. The FCC cannot change the current market structure given the constraints of limited spectrum. As such, the question for the FCC, therefore, becomes, "Are the cellular carriers operating as competitively as possible, given the constraints imposed by limited spectrum." The answer appears, from the market experience to be "Yes." The FCC can ask for no more. Furthermore, there is no evidence that continued regulation would lead to a better result. Indeed, it is regulation that keeps cellular service prices higher in a number of states such as California than would occur under competition.[3]

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[3] The California PUC has stated that cellular prices have not decreased as they had hoped after instituting regulation. California restricts cellular competition more than any other state. Indeed, California is the only state which forbids bundling of cellular equipment and service which the FCC has previously found is pro-competitive. Clearly, something is wrong with the California regulatory framework since competition has worked to bring lower prices in other states than California's extremely restrictive regulatory policy for cellular.

B. Competition is Increasing Among Mobile Service Providers

11. Competition is increasing significantly in mobile communications with the operation of Nextel's (formerly Fleet Call) ESMR networks. Nextel's original plan was to offer ESMR in six cities. Nextel has begun operation in Los Angeles and plans to begin operation in San Francisco and New York next year. Nextel has now expanded its plans, and has purchased sufficient ESMR spectrum from Motorola and other companies to be able to offer its services to about 70% of the population in the U.S.[4] Nextel's proposed service areas covers about 180 million people and 45 of the top 50 U.S. SMSAs. Nextel has not encountered any difficulty in raising capital to finance these expansion plans. Indeed, the market capitalization of Nextel currently exceeds $3.3 billion. Thus, Nextel will be a formidable competitor to cellular with its all digital network offering service in almost all areas of the U.S.[5]

12. Nextel is conspicuously absent from the Reseller's filing except via a mention that "at some future date" Nextel may have a competitive effect (p. 5) and a claim that ESMR companies might not be profitable for five years. (p. 5). The Resellers remarks here do not accord with reality. Nextel is currently in operation so that they cannot be wished away at the stroke of a lawyer's pen. Investors certainly expect Nextel to succeed as Nextel's stock has quadrupled since the initial public offering last year. The lack of expected profit for five years does not stop investors. Almost no cellular company made a profit in the first five years because of the requirements to build out a cellular network. Once network investment slows down profits will flow to investors to pay them back. However, during this entire period the cellular companies competed for customers. Nextel will do the same, thus increasing competition with cellular companies throughout the U.S.

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[4] McCaw, the largest cellular carrier, has service areas which cover about 25% of the U.S. population.

[5] At least two other ESMR companies, Dialpage and Cencall, are also expanding rapidly to offer widespread geographical service in the near future.

C. The Resellers Provide No Evidence that Regulation will Help Consumers

13. The resellers put forward no evidence that regulation of mobile services would help consumers. Indeed, my econometric study demonstrates that cellular regulation harms consumers. Instead, the Resellers refer to a study by Prof. T. Hazlett, "Market Power in the Cellular Telephone Duopoly" which was submitted on behalf of Time Warner Telecommunications during the PCS proceedings in August 1993. However, Professor Hazlett has made a fundamental error in his economic analysis. His q-ratio evidence from which he infers that cellular companies have market power can be explained totally by the scarcity of spectrum for cellular telephony.[6] Professor Hazlett never separates out the value of the spectrum scarcity from the exercise of market power, if any market power is currently being exercised.[7]

14. Furthermore, I have done a previous econometric study which refutes Hazlett's and the Reseller's claims that cellular companies are not competing. Previous econometric analysis that I have done demonstrates that monopoly conditions do not exist. Almost every elementary economics textbook demonstrates that a monopolist will always increase price so that the price elasticity exceeds one.[8] Yet my econometric analysis has found the price elasticity in cellular markets to be far below one--more in the range of 0.3-0.4.[9] The claim of the Resellers (p. 12) that cellular carriers are engaged

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[6] Professor Hazlett has also made a number of incorrect or questionable assumption about the cost of cellular networks and their expected economic life. See J. Haring and C. Jackson, "Errors in Hazlett's Analysis of Cellular Rents", prepared on behalf of Bell Atlantic, September 1993.

[7] Indeed, according to Prof. Hazlett's reasoning when PCS spectrum is acutioned, the prices for the spectrum will prove that market power exists in PCS. The correct inference, however, is that the auction values reflect expected future rents to scarce spectrum.

[8] I will use the absolute value of the price elasticity in the discussion which follows.

[9] In the case of cable TV most econometric estimates find the price elasticities to be greater than 1.0 which is consistent with a lack of competition for cable providers.

in "monopolistic or anti-competitive practices" is refuted by actual cellular price and demand data. Thus, price data for cellular is consistent with competition among the two cellular providers in each MSA. No one can expect perfect competition, because of scarcity of spectrum, but the presence of imperfect competition does not imply that regulation will lead to a better outcome for consumers. Otherwise, the U.S. would regulate 99% of its industries since almost no industry is characterized by perfect competition.

15. The Resellers realize that PCS will soon increase competition in mobile services even more. However, they claim that regulation is needed in advance of PCS or cellular carriers might engage in predatory pricing. (pp. 8-9). This claim is not based on economic analysis. As all economists agree, predatory pricing cannot succeed unless barriers to entry exist and the new spectrum to be auctioned by the FCC guarantees that PCS entry will occur so that barriers to entry will not exist. Not only do economists believe that predatory pricing almost never happens, but the Courts have come to the same conclusion. The U.S. Supreme Court stated in 1986 that "predation is rarely attempted and even more rarely successful". In 1993 the Supreme Court again stated that predatory pricing is extremely unlikely to occur. For the Resellers to call for regulation based on business practices which are almost never encountered seems an extremely odd way for the FCC to make a policy determination.

16. The Resellers are asking for the institution of cost based rate of return regulation (ROR) for wholesale cellular service. They state: ...such [wholesale] rates must reflect only the cost (including a reasonable rate of return) to provide that service to the reseller. (p. 18) Institution of ROR regulation for a dynamically changing industry such as cellular would be an economic disaster. The FCC has recognized the adverse economic effects of ROR regulation for landline telecommunications and has instituted price cap

regulation.[10] ROR regulation would retard technological advancement in cellular and lead to decreased consumer welfare.

D. Forbearance From Regulation of Wholesale Rates will Help Consumers and Mobile Services Satisfy the Criteria for FCC Forbearance

17. Forbearance from regulation of cellular prices is also consistent with the FCC criteria: (1) charges are just and reasonable and not unreasonably discriminatory (2) enforcement is not necessary for the protection of consumers (3) forbearance is in the public interest. First, I have discussed above why rates are just and reasonable because of the presence of competition among cellular carriers. Growth of cellular service has averaged 35-40% per year so that consumers have found cellular to be a valuable telecommunications service. Rates are also not unjustly discriminatory since the bundling of cellular equipment and services has led to lower consumer prices and has been found to be a pro-competitive practice by the FCC previously.[11]

18. The next criterion, consumer protection, is also satisfied by cellular competition. Indeed, not only has competition protected consumers, it has led to lower prices than regulation of cellular. Thus, the last criterion is also satisfied--forbearance from regulation of wholesale cellular prices is also in the public interest. Experience to date has demonstrated that competition leads to lower cellular prices than regulation. A similar outcome is likely to occur with PCS which will greatly increase competition among mobile service providers. Thus forbearance from wholesale rate

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[10] The California PUC has stated a number of times that it does not favor cost based rate of return regulation for cellular service. Indeed, California ended cost based rate of return regulation for its landline telephone service regulation of Pacific Bell and GTEC in 1990.

[11] Both the FTC and the DOJ also entered comments which found that bundling of cellular equipment and services was pro-competitive and led to lower prices to consumers.

regulation for mobile services meets the FCC criteria and leads to a pro-consumer outcome.

Jerry A. Hausman 18 Nov 1993

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Exhibit 1

Price Regression for Top 40 Cellular Markets

Left Hand Side Variable: Log of Price <1

Variable	Estimate	Standard Error
Intercept	−0.070	1.428
Log of Income <2	0.295	0.159
Log of Population <3	−0.029	0.045
Log of Commute Time <4	0.538	0.221
Regulation	0.075	0.040
Wireline	0.008	0.033
Number of Observations	78	
Standard Error of Regression	0.148	
R Squared	0.288	

Notes: 1> Minimum monthly bill is based on 128 minutes of peak calling and 32 minutes of off−peak calling.
2> Log of per capita personal income. Source: Survey of Current Business, April 1992.
3> Log of population. Source: 1992 Statistical Abstract.
4> Mean commute time from home to work. Source: 1990 U.S. Census, Tape File 3c.

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Phi Beta Kappa
Marshall Scholar at Oxford, 1970-1972
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Associate Editor, Bell Journal of Economics, 1974-1983
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Associate Editor, Econometrica, 1978-1987
Reviewer, Mathematical Reviews, 1978-1980
American Editor, Review of Economic Studies, 1979-82
Associate Editor, Journal of Public Economics, 1982-
Associate Editor, Journal of Applied Econometrics, 1985-
Member of MIT Energy Laboratory Policy Research Group, 1973-
Research Associate, National Bureau of Economic Research, 1979-
Member, American Statistical Association Committee on Energy Statistics, 1981-1984
Special Witness (Master) for the Honorable John R. Bartels, U.S. District Court for the Eastern District of New York in Carter vs. Newsday, Inc., 1981-82
Member of Governor's Advisory Council (Massachusetts) for Revenue and Taxation, 1984-1992
Member, Committee on National Statistics, 1985-1990
Member, Committee to Revise U.S. Trade Statistics 1990-1992
Director, MIT Telecommunications Economics Research Program, 1988-
Board of Directors, Theseus Institute, France Telecom University, 1988-

PUBLICATIONS:

I. Econometrics

"Minimum Mean Square Estimators and Robust Regression," Oxford Bulletin of Statistics, April 1974.

"Minimum Distance and Maximum Likelihood Estimation of Structural Models in Econometrics," delivered at the European Econometric Congress, Grenoble: August 1974.

"Full-Information Instrumental Variable Estimation of Simultaneous Equation Models," Annals of Economic and Social Measurment, October 1974.

"Estimation and Inference in Nonlinear Structural Models," Annals of Economic and Social Measurement, with E. Berndt, R.E. Hall, and B.H. Hall, October 1974.

"An Instrumental Variable Approach to Full-Information Estimators in Linear and Certain Nonlinear Econometric Models," Econometrica, May 1975.

"Simultaneous Equations with Errors in Variables," delivered at Winter Econometric Meetings, San Francisco: December 1974; published in Journal of Econometrics 5, 1977, pp. 389-401.

"Social Experimentation, Truncated Distributions, and Efficient Estimation," delivered at the World Econometric Congress, Toronto: August 1975; Econometrica, with D. Wise, June 1977.

"A Conditional Probit Model for Qualitative Choice," delivered at World Econometric Congress, Toronto: August 1975; MIT Working Paper 173, April 1976; Econometrica, with D. Wise, March 1978.

"Specification Tests in Econometrics," MIT Working Paper 185, June 1976; Econometrica, 1978.

PUBLICATIONS cont.:

"Non-Random Missing Data," with A.M. Spence, MIT Working Paper 200, May 1977.

"Attrition Bias in Experimental and Panel Data: The Gary Income Maintenance Experiment," with D. Wise, J.F. Kennedy School Working Paper, May 1977; Econometrica, January 1979.

"Missing Data and Self Selection in Large Panels," with Z. Griliches and B.H. Hall, Harvard Economics Department Working Paper, August 1977; delivered at INSEE conference on Panel Data, Paris: August 1977; Annales de l'INSEE, April 1978.

"Stratification on Endogenous Variables and Estimation," with D. Wise, J.F. Kennedy School Working Paper, January 1978; delivered at CME Conference, April 1978; in The Analysis of Discrete Economic Data, ed. C. Manski and D. McFadden, MIT Press, 1981.

"Les models probit de choix qualitatifs," ("Alternative Conditional Probit Specifications for qualitative Choice.") (English Version), September 1977; EPRI report on discrete choice models, presented at INSEE Seminar, Paris: May 1978; Cahiers du Seminar d'Econometrie, 1980.

"The Econometrics of Labor Supply on Convex Budget Sets," Economic Letters, 1979.

"Panel Data and Unobservable Individual Effects," with W. Taylor, MIT Working Paper 225; Econometrica 49, November 1981.

"Comparing Specification Tests and Classical Tests," with W. Taylor, August 1980, Economic Letters, 1981.

"The Effect of Time on Economic Experiments," invited paper at Fifth World Econometrics Conference, August 1980; in Advances in Econometrics, ed. W. Hildebrand, Cambridge University Press, 1982.

"Sample Design Considerations for the Vermont TOD Use Survey," with John Trimble, Journal of Public Use Data, 9, 1981.

"Identification in Simultaneous Equations Systems with Covariance Restrictions: An Instrumental Variable Interpretation," with W. Taylor, December 1980; Econometrica, 1983.

"Stochastic Problems in the Simulation of Labor Supply," presented at NBER conference, January 1981; in Tax Simulation Models, ed. M. Feldstein, University of Chicago Press, 1983.

"The Design and Analysis of Social and Economic Experiments," invited paper for 43rd International Statistical Institute Meeting, 1981; Review of the ISI.

"Specification and Estimation of Simultaneous Equation Models," in Handbook of Econometrics, ed. Z. Griliches and M. Intriligator, vol. 1, 1983.

"Full-Information Estimators," in Kotz-Johnson, Encyclopedia of Statistical Science,vol. 3, 1983

"Instrumental Variable Estimation," in Kotz-Johnson, Encyclopedia of Statistical Science, vol. 4, 1984

PUBLICATIONS cont.:

"Specification Tests for the Multinomial Logit Model," with D. McFadden, October 1981; Econometrica, 1984.

"Econometric Models for Count Data with an Application to the Patents R&D Relationship," with Z. Griliches and B. Hall, NBER Working Paper, August 1981; Econometrica, 1984.

"The Econometrics of Nonlinear Budget Sets," Fisher-Shultz lecture for the Econometric Society, Dublin: 1982; Econometrica, 1985.

"The J-Test as a Hausman Specification Test," with H. Pesaran, November 1982; Economic Letters, 1983.

"Seasonal Adjustment with Measurement Error Present," with M. Watson, May 1983; Journal of the American Statistical Association, 1985.

"Efficient Estimation and Identification of Simultaneous Equation Models with Covariance Restrictions," with W. Newey and W. Taylor, October 1983; Econometrica, 1987.

"Technical Problems in Social Experimentation: Cost Versus Ease of Analysis," with D. Wise, in Social Experimentation, ed. J. Hausman and D. Wise, 1985.

"Errors in Variables in Panel Data," with Z. Griliches, Journal of Econometrics, 1986.

"Specifying and Testing Econometric Models for Rank-Ordered Data," with P. Ruud; Journal of Econometrics, 1987.

"Semiparametric Identification and Estimation of Polynomial Errors in Variables Models," with W. Newey, J. Powell and H. Ichimura, 1986, Journal of Econometrics, 1991.

"Flexible Parametric Estimation of Duration and Competing Risk Models," with A. Han, November 1986, revised January 1989, Journal of Applied Econometrics, 1990.

"Consistent Estimation of Nonlinear Errors in Variables Models with Few Measurements," with W. Newey and J. Powell, 1987.

"Nonlinear Errors in Variables: Estimation of Some Engel Curves," Jacob Marschak Lecture of the Econometric Society, Canberra 1988, forthcoming in Journal of Econometrics.

"Optimal Revision and Seasonal Adjustment of Updated Data: Application to Housing Starts," with M. Watson, Journal of the American Statistical Association Proceedings, 1991.

"Seasonal Adjustment of Trade Data," with R. Judson and M. Watson, ed. R. Baldwin, Behind the Numbers: U.S. Trade in the World Economy, 1992.

"Nonparametric Estimation of Exact Consumers Surplus and Deadweight Loss," with W. Newey, 1990, revised 1992.

PUBLICATIONS cont.:

II. Public Finance

"The Evaluation of Results from Truncated Samples," with D. Wise, Annals of Economic and Social Measurement, April 1976.

"Discontinuous Budget Constraints and Estimation: The Demand for Housing," with D. Wise, J.F. Kennedy School Working Paper, July 1977; Review of Economic Studies, 1980.

"The Effect of Taxation on Labor Supply: Evaluating the Gary Negative Income Tax Experiment," with G. Burtless, October 1977; Journal of Political Economy, December 1978.

"AFDC Participation -- Permanent or Transitory?," delivered at NBER-NSF Conference, August 1978; in Papers from the European Econometrics Meetings, ed. E. Charatsis, North Holland: 1981.

"The Effect of Wages, Taxes, and Fixed Costs on Women's Labor Force Participation," March 1979; presented at SSRC-NBER Conference on Taxation, Cambridge, England: June 1979; Journal of Public Economics, October 1980.

"The Effect of Taxes on Labor Supply," presented at Brookings Conference, October 1979; published in How Taxes Affect Economic Behavior, ed. H. Aaron and J. Pechman, Brookings: 1981.

"Income and Payroll Tax Policy and Labor Supply," presented at St. Louis Fed. conference, October 1980; in The Supply Side Effects of Economic Policy, ed. G. Burtless, St. Louis: 1981.

"Individual Retirement Decisions Under an Employer-Provided Pension Plan and Social Security," with G. Burtless, Journal of Public Economics, 1982.

"Individual Retirement and Savings Decisions," with P. Diamond, October 1981; presented at SSRC-NBER Conference on Public Economics, Oxford: June 1982; Journal of Public Economics, 1984.

"Retirement and Unemployment Behavior of Older Men," with P. Diamond, presented at Brookings Conference on the Aged, November 1982; in H. Aaron and G. Burtless, Retirement and Economic Behavior, Brookings: 1984.

"Tax Policy and Unemployment Insurance Effects on Labor Supply," May 1983; in Removing Obstacles to Economic Growth, ed. M. Wachter, 1984.

"Family Labor Supply with Taxes," with P. Ruud, American Economic Review, 1984.

"Social Security, Health Status and Retirement," with D. Wise, in Pensions, Labor, and Individual Choice, ed. D. Wise, 1985.

"The Effect of Taxes on Labor Supply," January 1983; in Handbook on Public Economics, ed. A. Auerbach and M. Feldstein, 1985.

"Choice Under Uncertainty: The Decision to Apply for Disability Insurance," with J. Halpern, Journal of Public Economics, 1986.

PUBLICATIONS cont.:

"Household Behavior and the Tax Reform Act of 1986," with J. Poterba, October 1986; Journal of Economic Perspectives, 1987, also published in French in Annales D'Economie et de Statistique, 1988.

"Involuntary Early Retirement and Consumption," with L. Paquette, ed. G. Burtless, Economics of Health and Aging, 1987.

"Income Taxation and Social Insurance in China," in Sino-U.S. Scholars on Hot Issues in China's Economy, 1990.

"On Contingent Valuation Measurement of Nonuse Values," with P. Diamond, forthcoming in Contingent Valuation: A Critical Appraisal, ed. J. Hausman.

"Does Contingent Valuation Measure Preferences? Experimental Evidence," with P. Diamond, G. Leonard, M. Denning, Discussion Paper, April 1992.

III. Applied Micro Models

"Project Independence Report: A Review of U.S. Energy Needs up to 1985," Bell Journal of Economics, Autumn 1975.

"Individual Discount Rates and the Purchase and Utilization of Energy Using Durables," MIT Energy Laboratory Working Paper, January 1978; Bell Journal of Economics, Spring 1979.

"Voluntary Participation in the Arizona Time of Day Electricity Experiment," with D. Aigner, May 1978; delivered at EPRI Conference on Time of Day Pricing, June 1978; in EPRI Report, Modeling and Analysis of Electricity Demand by Time of Day, 1979; Bell Journal of Economics, 1980.

"A Two-level Electricity Demand Model: Evaluation of the Connecticut Time-of-Day Pricing Test," delivered at EPRI Conference on Time of Day Pricing; with D. McFadden, in EPRI Report, Modeling and Analysis of Electricity Demand by Time of Day, 1979; Journal of Econometrics, 1979.

"Assessing the Potential Demand for Electric Cars," with S. Beggs and S. Cardell, presented at EPRI Conference, November 1979; Journal of Econometrics, 1981.

"Assessment and Validation of Energy Models," presented at EIA-NBS conference on Energy Models, May 1980; in Validation and Assessment of Energy Models, ed. S. Gass, Washington: Department of Commerce, 1981.

"Exact Consumer Surplus and Deadweight Loss," working paper 1979, American Economic Review, 71, 1981.

"Appliance Purchase and Usage Adaptation to a Permanent Time of Day Electricity Rate Schedule," with J. Trimble, August 1983; Journal of Econometrics, 1984.

"Evaluating the Costs and Benefits of Appliance Efficiency Standards," with P. Joskow, MIT Energy Lab Working Paper, MIT-EL82005WP; American Economic Review, 72, 1982.

PUBLICATIONS cont.:

"Information Costs, Competition and Collective Ratemaking in the Motor Carrier Industry," presented at Conference On Consensual Decision Making, American University, August 1982; American University Law Review, 1983.

"An Overview of IFFS," presented at EIA-NBS Conference on Energy Models, August 1982; in Intermediate Future Forecasting System, ed. S. Gass et al., Washington: 1983.

"Choice of Conservation Actions in the AHS," November 1982; in Energy Simulation Models, ed. R. Crow, 1983.

"Patents and R&D: Searching for a Lag Structure," with B. Hall and Z. Griliches, in Actes du Colloque Econometrie de la Recherce, Paris: 1983.

"The Demand for Optional Local Measured Telephone Service," in Adjusting to Regulatory, Pricing and Marketing Realities, East Lansing: 1983.

"Patents and R&D: Is There a Lag?," with B. Hall and Z. Griliches, 1985; International Economic Review, 1986.

"Price Discrimination and Patent Policy," with J. MacKie-Mason, Rand Journal of Economics, 1988.

"Residential End-Use Load Shape Estimation from Whole-House Metered Data," IEEE Transactions on Power Systems, 1988 (with I. Schick, P. Vsoro, and M. Ruane).

"Competition in Telecommunications for Large Users in New York," with H. Ware and T. Tardiff, Telecommunications in a Competitive Environment, 1989.

"Innovation and International Trade Policy," Oxford Review of Economic Policy, 1988 (with J. MacKie-Mason).

"The Evolution of the Central Office Switch Industry," with W. E. Kohlberg, 1987; forthcoming in ed. S. Bradley and J. Hausman, Future Competition in Telecommunications, 1989.

"Future Competition in Telecommunications," 1987; ed. S. Bradley and J. Hausman, Future Competition in Telecommunications, 1989.

"Joint Ventures, Strategic Alliances and Collaboration in Telecommunications," presented at International Conference on Joint Ventures in Telecommunications, October 1989, Regulation, 1991.

"An Ordered Probit Model of Intra-day Securities Trading," with A. Lo and C. MacKinlay, Journal of Financial Economics, 1992.

"A Proposed Method for Analyzing Competition Among Differentiated Products," with G. Leonard and J.D. Zona, Antitrust Law Journal, 60, 1992.

PUBLICATIONS cont.:

"A Utility-Consistent Combined Discrete Choice and Count Data Model: Assessing Recreational Use Losses Due to Natural Resource Damage," with G. Leonard and D. McFadden, Discussion Paper, April 1992.

"Global Competition and Telecommunications," in Bradley, et al., ed., Globalization, Technology and Competition, 1993.

"The Bell Operating Companies and AT&T Venture Abroad and British Telecom and Others Come to the US," presented at Harvard Business Conference on International Telecommunications, 1991, in Bradley, et al., ed., Globalization, Technology and Competition, 1993.

"Competitive Analysis with Differentiated Products," with G. Leonard and D. Zona, Discussion Paper, October 1992.

"The Effects of the Breakup of AT&T on Telephone Penetration in the US," with T. Tardiff and A. Belinfante, American Economic Review, 1993.

"Proliferation of Networks in Telecommunications," presented at Michigan Conference on Regulation, March 1993.

JOINT REPORTS, TESTIMONY, AND BOOKS:

"Project Independence: An Economic Analysis," Technology Review, May 1974.

"The FEA's Project Independence Report: Testimony before Joint Economic Committee," U.S. Congress, March 18, 1975.

"The FEA's Project Independence Report: An Analytical Assessment and Evaluation," NSF Report, June 1975.

"Energy Demand in the ERDA Plan," with D. Wood, Energy Laboratory Report, August 1975.

"A Note on Computational Simplifications and Extensions of the Conditional Probit Model," EPRI report on choice models, September 1977.

"Labor Supply Response of Males to a Negative Income Tax," Testimony for U.S. Senate Finance Subcommittee on Public Assistance, November 22, 1978.

"Appliance Choice with Time of Day Pricing," Energy Laboratory Report, January 1980.

"Discrete Choice Models with Uncertain Attributes," Oak Ridge National Laboratories Report, January 1980.

"Individual Savings Behavior," with P. Diamond, Report to the National Commission on Social Security, May 1980.

"Wealth Accumulation and Retirement," with P. Diamond, Report to the Department of Labor, May 1982.

JOINT REPORTS, TESTIMONY, AND BOOKS cont.:

"A Review of IFFS," Report to the Energy Information Agency, February 1982.

"A Model of Heating System and Appliance Choice," with J. Berkovec and J. Rust, December 1983.

"Labor Force Behavior of Older Men After Involuntary Job Loss," with L. Paquette, Report to Department of Health and Human Services, December 1985.

"Pollution and Work Days Lost," with D. Wise and B. Ostrow, NBER Working Paper, January 1984; Revised 1985.

"Demand for Interstate Long Distance Telephone Service," with A. Jafee and T. Tardiff, November 1985.

"Competition in the Information Market 1990", August 1990.

The Choice and Utilization of Energy Using Durables, ed. J. Hausman, Palo Alto: EPRI, 1981.

Social Experimentation, ed. J. Hausman and D. Wise, Chicago: 1985.

Future Competition in Telecommunications, ed. S. Bradley and J. Hausman, Harvard: 1989.

Contingent Valuation: A Critical Appraisal, ed. J. Hausman, forthcoming North Holland, 1993.

Globalization, Technology and Competition, ed. S. Bradley, J. Hausman, R. Nolan, Harvard 1993.

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